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# SOUTH COUNTY JOINT PLANNING PROGRAM

City of Morgan Hill    City of Gilroy    County of Santa Clara

## FLOOD CONTROL AND LOCAL DRAINAGE

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BACKGROUND REPORT  
FOR THE  
SOUTH COUNTY JOINT PLANNING PROGRAM

PREPARED BY: LORRAINE J. POGGIONE

COUNTY OF SANTA CLARA  
DEPARTMENT OF LAND USE AND DEVELOPMENT  
OFFICE OF PLANNING

Adopted: August 8, 1985

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FLOOD CONTROL AND LOCAL DRAINAGE6. Flood Control

- 6.1. Major flooding has inundated large areas in South Santa Clara County 13 times in the last 63 years. Today, about 14,800 acres in South County would be inundated in the event a 1% flood, (a flood that would occur on an average of 1 time in 100 years). Such a flood would result in substantial property damage and possible loss of life.
- 6.2. The major creeks subject to flooding in South County are the Pajaro River and the Llagas and Uvas Creeks and their tributaries.
- 6.3. There are three basic approaches to minimizing damages that occur from flooding.
  - a. Prevent inappropriate development in flood prone areas through land use planning and floodplain management practices (i.e., ordinances adopted in conjunction with the National Flood Insurance Program). This is primarily the responsibility of the Cities and the County, working in cooperation with the Santa Clara Valley Water District (SCVWD).
  - b. Provide flood protection in areas that are already developed or in areas that are planned for development by constructing flood control facilities.
  - c. Manage development through advanced planning and design standards to minimize off-site flooding and drainage problems.
- 6.4. It is currently the SCVWD's policy to assign highest priority to the construction of flood control projects which will protect areas subject to the greatest potential flood damage. Generally, such areas include those that have existing or planned urban development.
- 6.5. Currently, the two major flood control projects in South County are the Llagas Creek Watershed Project and the Uvas-Carnadero Creek Project.
- 6.6. Construction of the Llagas Creek Project has begun. This project is funded primarily with federal funds from the U.S. Soil Conservation Service (SCS) and local funds from the Santa Clara Valley Water District. However, due to uncertainties regarding the future of the Soil Conservation Service's P.L. 566 Small Watershed Protection Program, completion of this project is uncertain.





- 6.7. The proposed Uvas Creek Project is a federal project being designed by the U.S. Army Corps of Engineers. Work on this project will begin upon Congressional appropriation of construction funds.
- 6.8. If future development is allowed in flood-prone areas which will not be protected by the Llagas or Uvas Creek Projects, additional flood control facilities may need to be constructed to minimize flood hazards. Currently available sources of local funding are not adequate to provide for construction of these additional facilities.
- 6.9. Local revenue sources for flood control projects in the South County are extremely limited. This restricts the ability of the SCVWD to fund construction of flood control projects in South County, as well as its ability to provide local matching funds for federal flood control projects.
- 6.10. For future development, the construction of individual structure foundations above potential flood levels is one approach to reducing flood hazards in flood-prone areas. However, the cumulative effect of allowing many raised building pads within a floodplain can be to obstruct the flow of floodwaters and, by diverting them elsewhere, cause flooding on others. Also, this practice offers only an incomplete solution to the flood problem.
- 6.11. Development can lead to or add to flooding in other areas by increasing the rate and/or amount of runoff. It is generally the responsibility of the Cities and County to review and condition development such that no additional flooding is caused by a development.
- 6.12. The manner in which streamside development is designed can affect maintenance of flood control facilities, public recreation opportunities, preservation of open space, ease of patrolling, and the security of adjacent developments. The SCVWD encourages local agencies to design streets to separate residential land uses from creeks.
- 6.13. The Llagas Creek and Uvas Creek Flood Control Projects are designed to protect some of the land uses designated in the general plans of the Cities and the County, including presently developed and planned development areas of the cities. The projects may not protect any potential urbanization which the County or Cities might amend into their plans.
- 6.14. Cumulative effects of development along the upper reaches of Llagas Creek may result in the need to channelize and enlarge the creek, which may lead to environmental impacts to the riparian vegetation and natural habitat.



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- 6.15. Development that occurs within 50' of a creek is within the jurisdiction of the SCVWD and is reviewed by its staff. Development that occurs beyond 50' is within the jurisdiction of the Cities and County, which have responsibility for drainage plans and solutions for those developments. The SCVWD does not review these plans unless requested.
- 6.16. The SCVWD does not have jurisdiction or give input regarding the cumulative stormwater runoff and flooding impacts of projects approved by the Cities or the County; however the District is available to consult on these impacts, if requested.

## 7. Drainage

- 7.1. Local drainage is designed to provide a lower level of protection than that provided by major flood control facilities. In the unincorporated area, local drainage facilities are designed for a 3-10 year storm, while flood control facilities are designed for a 100 year, or 1%, flood event.
- 7.2. Many areas of the South County, including some of the areas planned for future development, are subject to local drainage problems relating to the lack of local drainage facilities and to the lack of installed flood control facilities into which local storm drains outfall.
- 7.3. Future development in South County will put increased demands on existing drainage facilities and will require additional facilities to be built where the existing facilities are inadequate.
- 7.4. Local drainage and flood control facilities are often interdependent. The proper functioning of local drainage facilities may require flood control improvements to provide additional flood control capacity.
- 7.5. In Santa Clara County, local drainage is under the jurisdiction of the Cities and the County, while flood protection is under the jurisdiction of the Santa Clara Valley Water District.
- 7.6. The South County would benefit from better coordination with the Cities and the County which have jurisdiction over local drainage and with the Santa Clara Valley Water District who has jurisdiction over flood control.
- 7.7. Gilroy's Master Storm Drainage Plan is consistent with current trends of development and can accommodate currently planned future growth.





- 7.8. Morgan Hill's Master Storm Drainage Plan is currently being revised to be consistent with current trends of development and to accommodate currently planned future growth.
- 7.9. Construction of comprehensive areawide drainage facilities in the unincorporated areas of South County is generally not economically feasible due to the low density of permissible development, which would not generate sufficient revenues to fund local drainage projects.
- 7.10. Drainage facilities in the unincorporated areas of South County are currently being installed by individual developers on a parcel-by-parcel basis at the time of development. Implementation of piecemeal solutions, however, is often not adequate to solve areawide drainage problems until most of the facilities are constructed.
- 7.11. With regards to local drainage in the unincorporated area, the County maintains existing drainage facilities in order to keep the County roads clear, any additional maintenance will require additional funding.
- 7.12. The County has prepared a Master Storm Drainage Plan which identifies necessary easements as well as existing and proposed storm water conveyances. However, there is no policy which requires a storm water management plan which would be intended to be a developers' comprehensive plan to manage the storm water runoff associated with a development.





# SOUTH COUNTY JOINT PLANNING PROGRAM

City of Morgan Hill    City of Gilroy    County of Santa Clara

## FLOOD CONTROL AND LOCAL DRAINAGE

BACKGROUND REPORT  
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PREPARED BY: LORRAINE J. POGGIONE

COUNTY OF SANTA CLARA  
DEPARTMENT OF LAND USE AND DEVELOPMENT  
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Adopted: August 8, 1985





## FLOOD CONTROL AND LOCAL DRAINAGE

### 6. Flood Control

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INFRASTRUCTURE: FLOOD CONTROL/DRAINAGE

Land development should be managed by the three jurisdictions to mitigate flooding problems and to minimize the need for public funding of additional flood control and local drainage facilities (other than for orderly, planned growth), since flooding affects substantial areas of South County, and the flood control projects now being constructed are designed to protect only existing developed and planned urban areas.

12. Flood Control

Flood damage in South County should be minimized through a combination of actions. In flood-prone areas, inappropriate development should be prevented through land use planning, urban development policies and land use regulations. Areas which are developed or planned for development should be protected by the construction of flood control facilities. Development should be managed through advanced planning and design standards to minimize off-site flooding and drainage problems.

- 12.1. Highest priority for construction of flood protection facilities should continue to be given:
  - a. first, to areas of existing development subject to the highest potential flood damage;
  - b. then, to undeveloped areas planned for urban development which would be subject to the highest potential of flood damage;
  - c. then, to agricultural lands; and
  - d. finally, to undeveloped areas not planned for urban development.
- 12.2. If federal and state funds are not available for future flood control facilities and such facilities must be funded locally, those property owners who would benefit from and those who contribute to the need for such facilities should pay the cost.
- 12.3. Developers whose proposed projects would induce downstream flooding should be required to provide mitigation to eliminate the flood-inducing impacts of their projects.
- 12.4. Streamside development should be designed in such a way as to facilitate maintenance of the waterway and protection of the environment and riparian areas.
- 12.5. If development is to be allowed in flood-prone areas, flood control facilities or appropriate flood-proofing should be provided prior to or in conjunction with development at developers' expense.





- 12.6. Where other mitigations do not solve the flooding problem, raising individual foundations (padding up structures) may be a solution; however, its use must be restricted in order to minimize the cumulative effects on adjacent areas.
- 12.7. The Cities and the County should require mitigation of any stormwater runoff produced by development that occurs beyond that described in the 1981 General Plans of the County and the Cities.
- 12.8. All local development should provide appropriate mitigations of off-site impacts. These may include: limiting runoff to pre-development levels and/or complete solutions to flooding and local drainage problems in the vicinity of the development. Methods may include: detention (storing runoff temporarily and then releasing it) or retention (storing runoff on-site for percolation).
- 12.9. Careful consideration should be given to the cumulative effects of development which would drain into the upper reaches of Llagas Creek and other creeks in order to avoid the need for channelization and consequent destruction of its riparian vegetation and natural habitat.



### 13. Local Drainage

Local drainage problems in South County should be minimized by preventing inappropriate development in areas which are prone to drainage problems and by using design standards and advanced planning to manage development. Developers of individual projects should be required to mitigate off-site and on-site impacts and, where appropriate, to install local drainage facilities which would contribute to an eventual areawide solution to the local drainage problems, preferably in the context of a master plan for local drainage which should be developed jointly by the Cities and the County.

- 13.1. Since County maintenance is limited to maintaining local storm drainage facilities which may affect County roads, any additional storm drain-related maintenance beyond that which is currently provided will require additional funding from residents and/or developers.
- 13.2. Those residents who benefit from as well as those who contribute to the need for local drainage facilities should pay for them.
- 13.3. The County and Cities should require a storm water management plan for each development. This plan, which should be presented early in the development stage, would describe the design implementation and maintenance of the local drainage facilities.
- 13.4. The Cities and the County should coordinate in the development of a master plan for local drainage. The master plan should include consideration of the interface between unincorporated areas and the city drainage systems.
- 13.5. Each development should provide mitigations of off-site and on-site impacts, as appropriate. These mitigations may include limiting runoff to pre-development levels and/or complete solutions to local drainage problems in the vicinity of the development. Methods may include detention or retention, with appropriate protection of groundwater quality.





BACKGROUND REPORT  
FOR THE  
SOUTH COUNTY JOINT PLANNING PROGRAM

**FLOOD CONTROL AND LOCAL DRAINAGE**

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COUNTY OF SANTA CLARA  
DEPARTMENT OF PLANNING AND LAND DEVELOPMENT  
OFFICE OF PLANNING

JUNE 4, 1985

PREPARED BY  
LORRAINE J. POGGIONI





FLOOD CONTROL  
AND  
LOCAL DRAINAGE

TABLE OF CONTENTS

OVERVIEW

PART I. FLOOD CONTROL

I. FINDINGS

II. CURRENT SITUATION

- A. Flood Hazards in South County
- B. Flood Problem Areas
- C. Approaches to Minimizing Flood Hazards
- D. Areas to be Protected
- E. Current Flood Control Project
- F. Funding of Flood Control Projects
- G. Induced Flooding
- H. Streamside Development and Related Concerns

III. ISSUES AND OPTIONS FOR THE FUTURE

IV. RECOMMENDATIONS

PART 2) LOCAL DRAINAGE

I. FINDINGS

II. CURRENT SITUATION

A. Local Drainage Problems in South County

B. Interdependence Between Local Drainage and Flood Control  
Facilities

C. County and City Local Storm Drainage Plans

D. Funding of Local Drainage Facilities in South County

III. ISSUES AND OPTIONS FOR THE FUTURE

IV. RECOMMENDATIONS

Part 3) REFERENCES AND APPENDICES

## FLOOD CONTROL AND LOCAL DRAINAGE

### OVERVIEW

Many areas of the South Valley, including most of the areas planned for development, are subject to flooding and local drainage problems. In South Santa Clara County major flooding has inundated large areas 13 times in the last 63 year. If there was a 1% flood (that flood which would occur on an average of 1 time in 100 years), about 10,300 acres of the South Valley would be inundated.

Local drainage problems and flooding are part of the same continuum of drainage-related phenomena. Local drainage and flood control facilities are generally interdependent, inasmuch as local drainage flows usually outfall into flood control facilities.

In terms of the scale of the drainage problems, flood control hazards are generally more widespread and damaging than local drainage problems. The distinction between the two is sometimes rather arbitrary.

The Santa Clara Valley Water District distinguishes between the two based upon the area of the watershed involved. If the watershed or drainage area involved exceeds 320 acres, it is considered to be a "flooding" problem, over which the District assumes responsibility. Drainage problems involving less than 320 acres are considered by the District to be "local drainage" problems, which are the responsibility of the cities and/or the County.

Future development in South County will put increased demands on existing drainage facilities and will require additional facilities to be built where the existing facilities are inadequate.

Construction of drainage facilities in the unincorporated areas of South County are generally being installed on a piecemenal basis, however, implementation of parcel-by-parcel solutions is often not adequate to solve areawide drainage problems.

In addition, construction of areawide drainage solutions is generally not economically feasible due to the currently available funds.

This paper presents the findings, the issues, the current situations, and the recommendations for solving flooding and local drainage hazards. Although, flood control and local drainage are interdependent, they will be separated into two parts, Part 1 - Flood Control and Part 2 - Local Drainage, for ease of discussion and understanding. In the current situations of each part, the findings are underlined to highlight their correlation to the information within the text.



PART I

FLOOD CONTROL



I. FINDINGS

1. Major flooding has inundated large areas in South Santa Clara County 13 times in the last 63 years. Today, about 10,300 acres in South Valley would be inundated in the event a 1% flood, (a flood that would occur on an average of 1 time in 100 years). Such a flood would result in substantial property damage and possible loss of life.
2. The major creeks subject to flooding in South County are the Pajaro River and the Llagas and Uvas Creeks and their tributaries.
3. There are two basic approaches to minimize damages that occur from flooding:
  - a. Preventing inappropriate development in flood prone areas through land use planning and floodplain management practices (i.e., ordinances adopted in conjunction with the National Flood Insurance Program). This is primarily the responsibility of the Cities and the County, working in cooperation with the Santa Clara Valley Water District (SCVWD).
  - b. Providing flood protection in areas that are already developed or in areas that are planned for development by constructing flood control facilities.
4. It is currently the SCVWD's policy to assign highest priority to the construction of flood control projects which are subject to the greatest potential flood damage. Generally, such areas include those that have existing or planned urban development.
5. Currently, the two major flood control projects in South County are the Llagas Creek Watershed Project and the Uvas-Carnadero Creek Project.

6. Construction of the Llagas Creek Project has begun. This project is funded primarily with federal funds from the U.S. Soil Conservation Service (SCS). However, due to uncertainties regarding the future of the Soil Conservation Services, Small Watershed Protection, completion of this project is uncertain.
7. Construction of the Uvas Creek Project is planned to begin in spring 1986. Funding for this project appears to be available at this time.
8. If future development is allowed in flood prone areas which will not be protected by the Llagas or Uvas Creek projects, additional flood control facilities may need to be constructed to minimize flood hazards. Currently available sources of local funding are not adequate to provide for construction of these additional facilities.
9. Local revenue sources for flood control projects in the South County are extremely limited. This restricts the ability of the SCVWD to fund construction of flood control projects in South County, as well as its ability to provide local matching funds for federal flood control projects.
10. For future development, the construction of individual structure foundations above potential flood levels is one approach to reducing flood hazards in flood prone areas. However, the cumulative effect of allowing many raised building pads within a floodplain can be to obstruct the flow of floodwaters and, by diverting them elsewhere, cause flooding on others. Also, this practice offers only an incomplete solution to the flood problem.
11. Upstream development can lead to or add to downstream flooding by increasing the rate and/or amount of runoff.
12. The manner in which streamside development is designed can affect maintenance of flood control facilities, public recreation opportunities, preservation of open space, ease of patrolling, and the security of adjacent developments.



## II. CURRENT SITUATION

### A. Flood Hazards in South County

South Santa Clara County is highly susceptible to flooding. Throughout South County major flooding has inundated large areas 13 times in the last 63 years. If there were a 1% flood today, about 10,300 acres in South County would be inundated (see map 1 for areas subject to flooding).

A 1% flood is the flow of water that has a 1% chance of occurring in any given year. Sometimes the 1% flood is called the 100 year flood, because it is the flood flow that would be equalled or exceeded on an average of one time in 100 years. The 1% flood is the accepted standard of design for flood control facilities (see Appendix A for more information on 1% flood).

### B. Flood Problem Areas

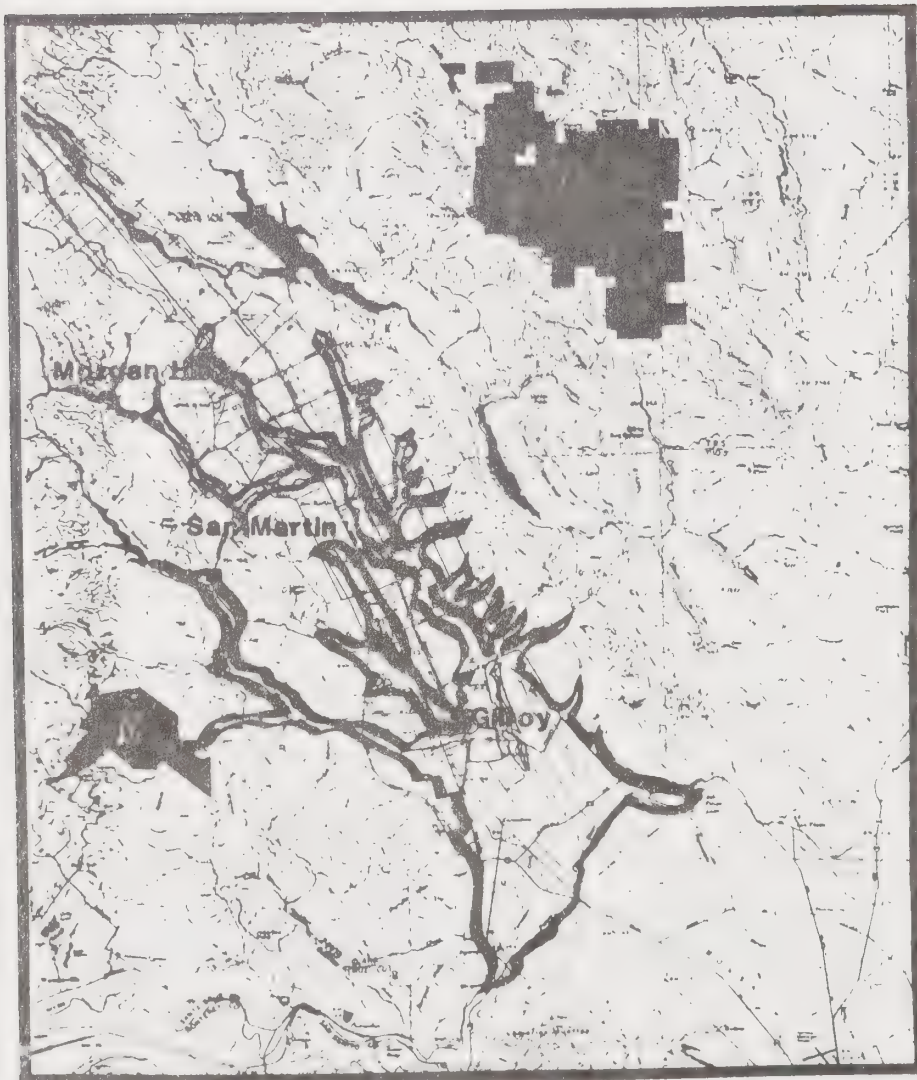
Studies by the U.S. Geological Survey and the Santa Clara Valley Water District show that the South Valley from Morgan Hill to the Pajaro Pass is the historic flood plain for the Llagas and Uvas Creeks and the Pajaro River. The dams at Uvas and Chesbro Reservoirs provide only incidental flood protection, however, a 1% flood would still be extensive and would cover most of the Valley floor.

South County has several major stream systems which are susceptible to flooding. The major creeks subject to flooding in South County are the Pajaro River and the Llagas and Uvas Creeks (see Map 2 for location of streams).

Santa Clara Valley Water District



**GENERALIZED MAP OF AREAS SUBJECT TO FLOODING  
FROM THE 1 PERCENT FLOOD  
IN SANTA CLARA COUNTY, CALIFORNIA  
BASED ON 1981 CONDITIONS**



**Map # 1**



The most recent information regarding the current flood problems in South County was obtained after the three large storms in 1983 from January 22-30, February 5-8, and February 28-March 4. According to the SCVWD "Report on Flooding and Related Damage; January 1-April 30, 1983," the peak flows for the creeks that flooded in the three storm periods varied from less than 2 years to 25 years compared to the 1% or 100 year flood criterion used for flood prevention design. Because these more frequent smaller storms occurred back to back, flood damage was greater than would be expected from individual 2 to 25 year storms.

In 1983, several Llagas Creek tributaries south of Morgan Hill experienced flooding. They included such creeks as: West Little Llagas, East Little Llagas, Corralitos, Tennant, San Martin, Church, Rucker, Skillet, San Ysidro, and West Branch Llagas. A number of homes in low lying areas in the Morgan Hill, San Martin and Gilroy areas had their access roads and their septic systems impaired by flooding.

According to the 1983 "Report on Flooding," the Llagas Creek project will alleviate flooding in the West Little Llagas Creek, West Branch Llagas Creek, Lions Creek and Miller Slough.

The Uvas Creek Watershed southwesterly of Gilroy also experienced flooding and erosion in 1983. Downstream from the confluence of Uvas and Little Arthur Creeks, the adjacent flat lands were flooded and water was spread out within the Uvas Creek flood plain area. At the confluence of the Pajaro River and Carnadero Creek, flood-waters covered about 1,000 acres of agricultural land in Santa Clara and San Benito Counties to depths of 2 to 10 feet. Earlier floods occurred on the Uvas-Carnadero Creek in 1937, 1940, 1955, 1958, and 1963.



### C. Approaches to Minimizing Flood Hazards

There are two basic approaches to minimize damages that occur from flooding in South County:

- 1) Preventing inappropriate development in flood prone areas through land use planning and floodplain management ordinances (i.e.: ordinance adopted in conjunction with the National Flood Insurance Program). This is primarily the responsibility of the cities and the County working in cooperation with the Santa Clara Valley Water District, and
- 2) Providing flood protection in areas that are already developed or in areas that are planned for development by constructing flood control facilities.

Various agencies are involved in carrying out these two approaches.

The Santa Clara Valley Water District is the local agency responsible for flood control, including planning, constructing, maintaining, and operating, flood control facilities (See Appendix B). It is necessary for the cities, the County, and the District to cooperate in their coordination of future land development and flood protection. Specific areas of coordination include such things as determining the location of development relative to flood control facilities as well as determining the land uses, style of development and street layout immediately adjacent to streams.

The cities and the County in their general plans designate the areas to be developed. Further, in their detailed plans and ordinances, they determine the nature of that development throughout the area and particularly along the stream banks. Land uses in designated floodways can be restricted through floodplain zoning where natural flood plains are the best solution to flood hazards.

The County of Santa Clara and every city in the County are in the National Flood Insurance Program, administered by the Federal Emergency Management Agency.

The National Flood Insurance Program requires that local governments take all actions possible to control development in a manner which minimizes the risk of flood damage. Under the program, the Cities and the County must adopt land use and development controls to assure that new structures are reasonably safe from flooding. Within the identified flood hazard area (area subject to the 1% flood) these measures require that new structures use flood-resistant materials, be adequately anchored, have first floors elevated above the level of the 1% flood, and be placed outside of designated floodways.

In the following sections, providing flood protection through the construction of flood control facilities is discussed.

#### D. Areas to be Protected

The Santa Clara Valley Water District's policy is to assign highest priority to the construction of projects which will protect areas of highest potential flood damage. The next highest priority is given to areas of planned urban development. The third priority is given to protection of agricultural lands threatened by the highest potential for flood damage. And the lowest priority is given to areas not currently planned for development.

The Llagas and Uvas Creek Projects are designed primarily to provide flood protection to areas already developed or designated for development in the Morgan Hill and Gilroy General Plans as they existed in 1982.

The Llagas Creek project is designed to protect approximately 2,200 acres of the potential 10,300 acres of valley floor likely to flood in a 1% flood. However, some portions of the project are not designed to accommodate a 1% flood and therefore development in these areas would be subject to flooding.

## F. Current Flood Control Projects

The two major flood control projects planned to reduce flood hazards in South County are: The Llagas Creek Watershed Project sponsored by the U.S. Soil Conservation Service and the Uvas-Carnadero Project sponsored by the U.S. Army Corps of Engineers. The Llagas Project, which began in 1971, is the larger and more costly of the two, while the Uvas project awaits start up in Spring 1986.

Another project, not yet funded, is the Tennant Corralitos Creek Project. This project was originally included in the Llagas Project but was deleted because it was found to have a benefit/cost ratio of less than 1.0 (federally sponsored flood control projects require a benefit cost ratio of 1.1 or greater). The District has prepared the Tennant - Corralitos Creek Project which is currently being reviewed by Morgan Hill due to the creek's local drainage implications in that area. If this project is done in the near future, it will have to be funded with local funds.

Following are descriptions of the two current South County flood control projects.

### 1) Llagas Creek Watershed Project

#### a) Background

The construction of the Llagas Creek project began in 1971-1972 when approximately 10.9 miles of channel were partially excavated by CALTRANS (formerly State Division of Highways) to provide fill for the South Valley Freeway. In 1973 about 1.2 miles of channel work were constructed by the U.S. Soil Conservation Service. These facilities reduce the flooding risk on about 3,400 acres of agricultural lands.

As a result of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) the Soil Conservation Service stopped construction in 1974 to further evaluate environmental impacts.

The three local sponsors, the Santa Clara Valley Water District, Loma Prieta Resource Conservation District, and the Gavilan Water Conservation District (G.W.C.D.), organized the Llagas Creek Citizens Advisory Committee to assist in finding ways to minimize adverse impacts and to recommend to the local sponsors a project plan. After many public meetings the local sponsors recommended a plan which was presented in a draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) and distributed for interagency review in July 1979. Two months later, a public meeting was held to discuss the plan. Citizens expressed strong opposition.

As a result of this citizen objection, the Board of Directors of the three local sponsors directed the Soil Conservation Service and the Santa Clara Valley Water District staff to re-study the project together and to come up with a new plan which 1) would show economic justification for the project and 2) identify and mitigate the environmental impacts. The re-study was done and it produced a new plan which was significantly smaller in both scope and cost than the first plan. The new plan deleted the proposal to raise Chesbro Reservoir (for flood storage), eliminated most of the flood protection from the agricultural acres (but keeping 18 protection for Morgan Hill and Gilroy) and added revegetation.

The current Llagas Creek Watershed Project reflects these changes.



b) Description of the Project

The project includes 29 miles of earthen and concrete lined channel. Of the 29 miles, 8.7 miles are of trapezoidal earth, 1.0 of reinforced concrete, 4.1 of new channel, 5.2 miles of existing channel that will be cleared of debris, and about 10 miles of channel already excavated by Caltrans in 1971.

Structures on the main channel, Llagas Creek, will be designed to permit passage of migrating fish (steelhead) by including fish ladders and a low flow channel. Drainage outlets will be provided to allow local drainage and storm runoff to enter the channels. Nineteen bridges and 15 box culverts will be replaced.

The project requires the acquisition of 171 acres by either purchasing or acquiring permanent easement, and relocation of two residences. Eighty of the 171 acres are agricultural lands. Installation of the project will require the removal of 19 acres of urban vegetation.

Mitigations include restoring the riparian habitat with vegetative plantings, installing low flow channels and fish ladders, establishing plantings to mitigate visual impacts, and complying with various local and state ordinances for air and water quality.

According to the May 1982 (Environmental Impact Statement/Report), in which there was a finding of no significant impact, the cost of the project will be approximately \$29,000,000. The average annual damages remaining will be approximately \$83,000. The cost of the annual damages prevented from the project's installation is approximately \$834,000. According to a spokesperson from the Soil Conservation Service Office in South County, the sixteen part, or reach, project has reaches



1, and 2 and half of reach 9 completed and is beginning on the second half of the third reach. Each part or reach of the flood control project consists of enlarging the channel. Generally the channel construction is done in one year and the riparian vegetation is done the following year (see figure 1).

Assuming combined federal funding approval, the current schedule for completion of the Llagas Project is to finish the Gilroy facilities by 1987 and the Morgan Hill facilities by 1989.

## 2) Uvas-Carnadero Project

### a. Background

The Uvas-Carnadero Creek is a tributary of the Pajaro River and is located in the northwestern quadrant of the basin. This creek is called Carnadero between U.S. Highway 101 and the Pajaro River, and called Uvas Creek upstream of Highway 101.

Uvas-Carnadero Creek drains through the mountainous terrain of the Santa Cruz Mountains and then enters the Santa Clara Valley, westerly of the City of Gilroy.

This project was authorized in 1944 to raise and lengthen an existing levee on Uvas-Carnadero Creek to provide flood protection to Gilroy.



b. Description of Project

This project includes modification of the existing levees along the north bank of the creek and a short tie levee to high ground at the upstream (Uvas) end of the project. The levee is designed to accomodate a 1% flood in the Gilroy area (see Map 3).

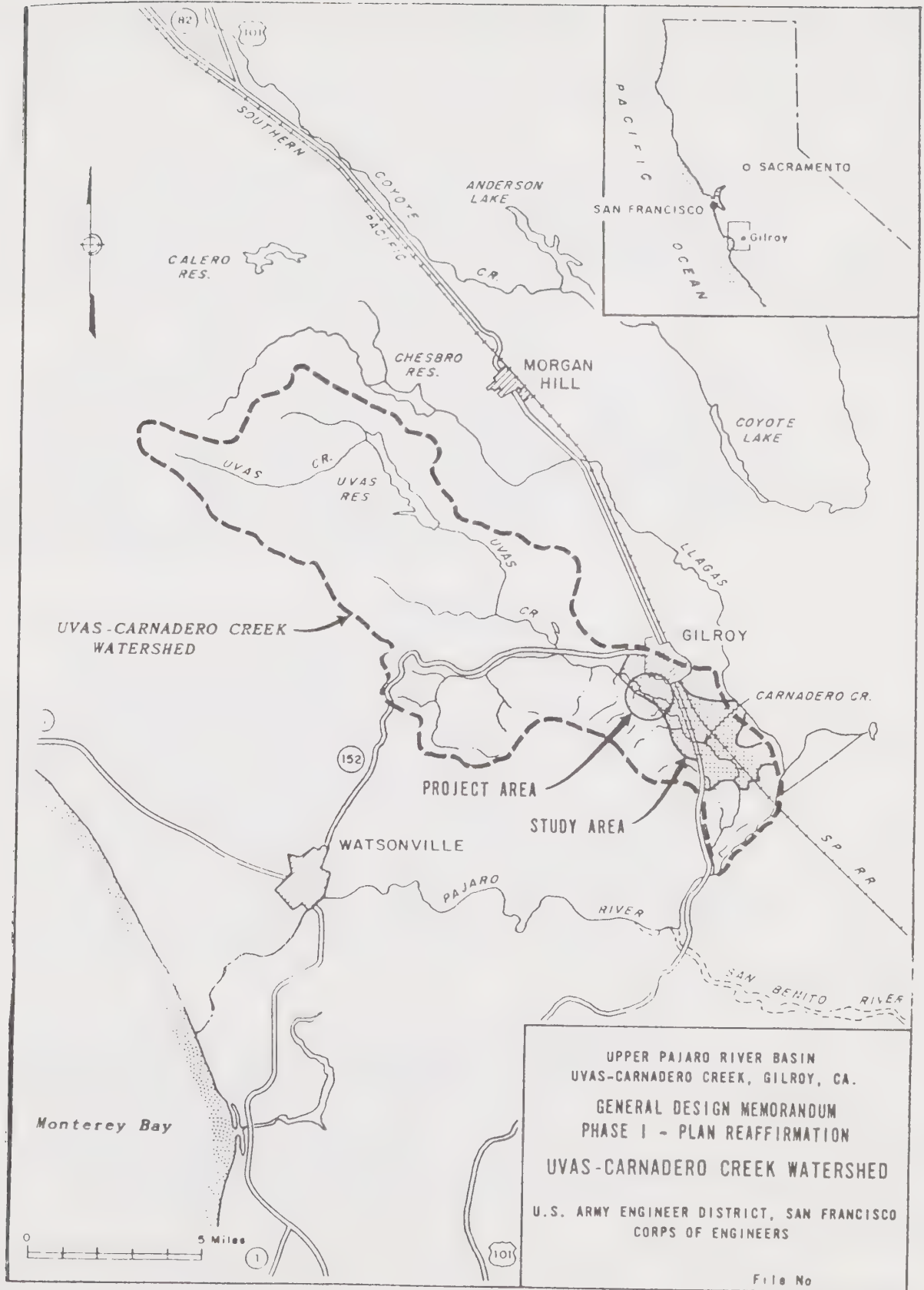
This project will result in a minor increase in the depth of flooding on the rural lands south of Gilroy, however, the potential damages can be mitigated by the purchase of flooding easements on the affected properties or by floodproofing the structures on those properties.

The City of Gilroy has prepared a plan for a 1.2 mile paved bikeway on the levee crown, 1.3 miles of hiking trail and a staging and parking area along Uvas Creek.

According to the draft 1980 "Pajaro River Basin Uvas-Carnadero Creek Draft Main Report and Environmental Statement," the estimated cost is \$3,206,000, of which \$1,184,000 will be federal funds. The annual cost is \$252,000 of which \$87,000 will be federal funds.

F. Funding of Flood Control Projects

The two major South County flood control projects under construction today in South Santa Clara County are to be funded primarily with federal funds. The Llagas Creek Project will be funded through the U.S. Soil Conservation Service (SCS). However, there are uncertainties regarding the future of the SCS-Small Watershed Protection Program, making completion of the Llagas project uncertain.





The Uvas Creek Project is funded through the U.S. Army Corps of Engineers. Funding for this project is provided in the Federal '86 budget. However, the budget is subject to Congressional approval in late Summer 1985.

Along with the federal funds needed for these flood control projects, local funds are necessary. The local funds are used to acquire any right-of-way needed for the project, to relocate utilities and to relocate bridges. For the Llagas Creek project, all such expenditures are 100% reimbursable from the State Department of Water Resources subvention program. For the Uvas project, 90% of the qualified local costs are reimbursable. Under the current State subventions program, the District must first "front" the local facility expenditures, then make a claim to the State which will then reimburse 90% of the funds within 9 months and reimburse the remaining 10% after necessary audits are complete.

The SCVWD obtains its funding for flood control projects primarily through its allocation of the 1% property tax and the District's benefit assessments (see Appendix C). The SCVWD has divided the County into 5 flood control zones (see Map 2 for zone locations). Revenues raised in each zone must be spent in that zone. While the South Zone is geographically large, its tax and assessment bases are relatively small. Consequently, local revenue sources for flood control projects in the South County are extremely limited. This restricts the ability of the SCVWD to fund construction of local flood control projects in South Santa Clara County as well as its ability to provide required local funds for the federally sponsored flood control projects.

If future development is allowed in flood prone areas which will not be protected by the Llagas or Uvas Creek Projects, additional flood control facilities may need to be constructed to minimize flood hazards. As indicated above, currently available sources of funding are not adequate to provide for construction of these additional facilities.



#### G. Induced Flooding

Often development that occurs in one area may cause or induce flooding problems in downstream areas. The more land that is covered with impermeable surfaces the greater the amount of water that will run off unless mitigating measures are installed. Thus, upstream development can lead to or add to downstream flooding by increasing the rate and/or amount of runoff from the upstream development.

If development is allowed in flood prone areas, flood control measures, such as padding up a foundation, are intended to reduce the flood hazards in flood prone areas. However, the cumulative effects of allowing these individual raised building pads within the floodplain may be to obstruct the flow of floodwaters, and by diverting them elsewhere, cause flooding on others.

#### H. Streamside Development and Related Concerns

The way in which streamside development is designed can affect maintenance of flood control facilities, open space preservation, public recreation opportunities, and security of adjacent developments. Historically, many subdivisions were designed and built with residential property lines adjacent to the creek banks. This has caused problems of limited access for stream maintenance and flood emergency activities, it has jeopardized security and restricted policing of the area and lastly, it precluded public recreation along the creek.

The Santa Clara Valley Water District wishes to encourage development that provides public streets which separate creeks and residences.

The streams that are the source of flooding are also habitat areas for fish, wild life and vegetation. They are seen by many people as potential public recreation areas and by many others as desirable surroundings for private residences. The District has the responsibility for minimizing flood damage while the cities and the County have the responsibility for determining land use along the creeks and specifying how the land will be developed. These local agencies seek to work together to reach the best balance among sometimes conflicting objectives.

There is a growing body of experience showing that good design can make multiple use of the streams possible, thus meeting a variety of needed objectives.

### III. ISSUES/OPTIONS

1. How should flood damage be minimized in South County?
  - A. By preventing inappropriate development in flood prone areas though land use planning, urban development policies, land use regulations, etc.
  - B. By protecting areas that are developed or planned for development from flooding with flood control facilities.
  - C. Both (A) and (B).
  
2. Given that there is limited funding for flood control facilities in South County, which areas should receive highest priority for protection from flooding?
  - A. Areas of existing development subject to the highest potential flood damage.
  - B. Undeveloped areas planned for urban development which would be subject to the highest potential flood damage.
  - C. Agricultural lands.
  - D. Undeveloped areas not planned for urban development.
  
3. If development occurs in areas not protected by the Llagas and Uvas projects, when should flood protection facilities be constructed?
  - A. Prior to development.
  - B. In conjunction with development.
  - C. After development.
  
4. If future funding for flood control facilities in South County must come primarily from local sources who should bear the burden of paying for those projects?
  - A. South County residents at large.
  - B. Residents who live within the individual watershed for which improvements are being constructed.
  - C. Those property owners who would benefit the most.

5. When upstream development contributes to downstream flooding, who should bear the burden of mitigating the increased flood hazards?

- A. Upstream property owner(s).
- B. Downstream property owner(s).
- C. Public at large.

6. How should streamside development be designed?

- A. Development separated from the creek a public street.
- B. Development backing up to creek.

7. How should the cumulative flood inducing effects of padding up of structures within a floodplain be minimized?

- A. Restricting the amount of development in floodplains.
- B. Providing flood control facilities which would make padding unnecessary.

#### IV. RECOMMENDATIONS

1. Minimize flood damage in South County through a combination of:
  - a. Preventing inappropriate development in flood prone areas through land use planning, urban development policies, land use regulations, etc., and,
  - b. Protecting areas that are developed or planned for development by the construction of flood control facilities.
2. Highest priority for construction of flood protection facilities should continue to be given to:
  - a. First, areas of existing development subject to the highest potential flood damage,
  - b. Then, undeveloped areas planned for urban development which would be subject to the highest potential of flood damage,
  - c. Then, Agricultural lands, and,
  - d. Finally undeveloped areas not planned for urban development.
3. If development is to be allowed in flood prone areas, flood control facilities or appropriate flood-proofing should be provided prior to or in conjunction with development at developers' expense.
4. If federal and state funds are not available for future flood control facilities and such facilities must be funded locally, those property owners who would benefit from and contribute to the need for such facilities should pay the cost.
5. Require developers whose proposed projects would induce downstream flooding to provide mitigation to eliminate the flood inducing impacts of their projects.



6. Design streamside development such that public streets separate flood control facilities from residential areas.
7. Minimize the cumulative flood inducing effects of padding up individual building sites by restricting the amount of development in flood prone areas.

PART II

LOCAL DRAINAGE



## LOCAL DRAINAGE

### 1. FINDINGS

#### Local Drainage Problems in South County

1. Many areas of the South Valley, including some of the areas planned for future development, are subject to local drainage problems relating to the lack of local drainage facilities and to the lack of installed flood control facilities into which local storm drains outfall.
2. Future development in South County will put increased demands on existing drainage facilities and will require additional facilities to be built where the existing facilities are inadequate.
3. Local drainage is designed to provide a lower level of protection than that provided by major flood control facilities. Local drainage facilities are designed for a 3-10 year storm, while flood control facilities are designed for a 100 year storm or 1% flood event.

#### Interdependence Between Local Drainage and Flood Control Facilities

4. Local drainage and flood control facilities are often interdependent. The proper functioning of local drainage facilities may require flood control improvements to provide additional flood control capacity.
5. In Santa Clara County, local drainage is under the jurisdiction of the Cities and the County, while flood protection is under the jurisdiction of the Santa Clara Valley Water District.

#### City Storm Drainage Plans

6. Gilroy's Master Storm Drainage Plan is consistent with current trends of development and can accommodate currently planned future growth.
7. Morgan Hill's Master Storm Drainage Plan is currently being revised to be consistent with current trends of development and to accommodate currently planned future growth.

#### Local Drainage Facilities in Unincorporated Areas

8. Construction of comprehensive areawide drainage facilities in the unincorporated areas of South County is generally not economically feasible due to the low density of permissable development, which would not generate sufficient revenues to fund local drainage projects.
9. Drainage facilities in the unincorporated areas of South County are currently being installed by individual developers on a parcel-by-parcel basis at the time of development. Implementation of piecemeal solutions, however, is often not adequate to solve areawide drainage problems until most of the facilities are constructed.



## LOCAL DRAINAGE

### II. CURRENT SITUATION

#### A. Local Drainage Problems in South Santa Clara County

Historically, South County's natural drainage patterns have adequately drained its runoff flows thus minimizing potential local drainage hazards. However, today in the South County, many of the areas are subject to local drainage problems, including some of the areas planned for development, due to the lack of flood control and local drainage facilities, for the most part, and to the relatively flat topography and farming practices to a lesser extent.

In addition, future development in South County will put increased demands on existing drainage facilities and will require additional facilities to be built where the existing facilities are inadequate.

Due to the lack of local drainage facilities and to the lack of flood control facilities, into which local storm drains outfall, local drainage flows may end up ponding for some period of time or spreading over the land.

Local drainage facilities are designed to provide a lower level of protection than that provided by major flood control facilities. Local drainage facilities are designed for a 3-10 year storm, while flood control facilities are designed for a 100 year or 1% flood. Thus, the runoff flows that exceed the local drainage facility's capacity, can lead to increased drainage problems in and around the problem areas.

Over the years, farming practices in South County have contributed to the loss of many stream channels which once conveyed drainage flows. Often times, soils are moved to accommodate various farming practices. In the process, stream channels are diverted or covered over, thus eliminating the pathways over which drainage waters used to flow and causing sheets of drainage flows to travel over the altered surface.

#### B. Interdependence Between Local Drainage and Flood Control Facilities

Local drainage and flood control facilities are often interdependent, particularly inasmuch as local drainage facilities usually drain into flood control channels. The proper functioning of local drainage facilities may require flood control improvements to provide additional capacity to the flood control facility in order to accommodate the local drainage flows.

Drainage problems can be separated into two categories, that of flooding and local drainage. In terms of scale, flood control hazards are generally more widespread and damaging than local drainage problems. However, flooding and local drainage problems share many of the same issues. Minimizing flooding and local drainage hazards as well as funding the solutions to these problems are two of the main concerns.

In Santa Clara County, local drainage is under the jurisdiction of the Cities and the County, while flood protection is under the jurisdiction of the Santa Clara Valley Water District.

#### C. County and City Local Storm Drainage Plans

##### 1. The County's Comprehensive Drainage Plan for Unincorporated Areas

In 1965, the Board of Supervisors adopted a county-wide master storm drainage plan. Part of this plan was updated in 1976 to specifically address the unincorporated areas of South County. Although the 1976 Comprehensive Drainage Plan for unincorporated South County was never formally adopted by the Board of Supervisors, its contents are referred to and utilized as if it were an official document.

##### 2. The Cities' Master Storm Drainage Plans

Each of the Cities is responsible for the planning, construction, maintenance, and funding of their own local drainage facilities. In order to anticipate and provide for local drainage needs, the Cities of Gilroy and Morgan Hill have each adopted their own Master Storm Drainage Plans. Each of the Cities' Master Storm Drainage Plans has identified the areas of greatest drainage concerns.

Gilroy's Master Storm Drainage Plan is consistent with current trends of development and can accommodate currently planned future growth. Morgan Hill's Plan is currently being revised to be consistent with current trends of development and to accommodate currently planned future growth.

#### D. Funding of Local Drainage Facilities in South County

##### 1. Funding of Local Drainage Facilities in Unincorporated Areas

Construction of comprehensive areawide drainage facilities in the unincorporated areas of South County is generally not economically feasible due to the low density of permissible development, which would not generate sufficient revenues to fund local drainage projects.

Drainage facilities in unincorporated areas of South County are currently being installed on a parcel-by-parcel basis at the time of development. Implementation of piecemeal solutions, however, is often not adequate to solve areawide drainage problems, until most of the local drainage facilities are installed.

2. Funding of Local Drainage Facilities in the Cities

Local drainage facilities in the two cities are generally being installed at the time of development. Implementation of these local drainage facilities are intended to lead to eventual solutions to the Cities' local drainage problems. Each of the Cities' local drainage facilities are generally funded through either the city and/or the developer.

## LOCAL DRAINAGE

### III. ISSUES AND OPTIONS

#### Minimizing Local Drainage Problems in Unincorporated Areas

1. How should local drainage problems be minimized in unincorporated areas of South County?
  - a. Prevent inappropriate development in areas prone to drainage problems.
  - b. Require developers to install local drainage facilities for their individual projects that would contribute to an eventual areawide solution to the local drainage problems.

#### Funding Local Drainage Facilities

2. Who should pay for local drainage facilities?
  - a. Those residents who benefit from as well as contributed to the need for local drainage facilities.
  - b. The public at large in South County.

## LOCAL DRAINAGE

### IV. RECOMMENDATIONS

1. Local drainage problems should be minimized in South County by:
  - a. Preventing inappropriate development in areas prone to drainage problems, and
  - b. Requiring developers to install local drainage facilities for their individual projects that would contribute to an eventual areawide solution to the local drainage problems.





PART III

REFERENCES AND APPENDICES



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## APPENDICES

APPENDIX A- One Percent Flood

APPENDIX B- Flood Damage Reduction Program and Revenue Sources

APPENDIX C- Santa Clara Valley Water District Ordinance No. 83-2



APPENDIX A



## ONE PERCENT FLOOD

## 1

**What is a flood?**

A flood is more water than a creek, channel, or watercourse can carry. It is too much water in the wrong place.

When a watercourse is too small to contain the flow, the banks are overtopped. The results of this overflow may mean nuisance flooding, damaging flooding, or devastating flooding.

Nuisance flooding may mean inconveniences such as wet feet, tire spray, and soggy lawns. Damaging floods become expensive by soaking flooring, carpeting, and first floor furniture. Devastating floods can wash buildings and vehicles out of the way because the water is deep and moving quickly; and it can take lives.

While all three of these flood types can occur in Santa Clara Valley, nuisance and damaging floods probably create the most frequent concern and occur over larger areas.

## 2

**Do large storms always cause flooding?**

Although rain causes flooding, large rain storms don't always result in floods. The size of a flood depends not only on the amount of rainfall, but also on the conditions within the watershed before and during the storm.

When rain falls on a very wet watershed that is unable to absorb any more rain, or when a very large amount of rain falls on a dry watershed faster than it can be absorbed, it runs off.

In October, 1967, we had the second largest one-day rainfall ever recorded at the San Jose raingage. (The largest was 4.3 inches recorded during the 1918-1919 season.) Some 3.75 inches of rain fell. However, because the watersheds were dry, and significant amounts of floodwater were captured in less-than-full district reservoirs, there were no floods. Rain that fell on the Valley floor generally soaked into the earth or moved safely through flood channels to San Francisco Bay.

In contrast, the December, 1955 storm, which caused widespread flooding, produced only 1.90 inches of rain in one day at San Jose. Rain had been falling for many days, and the earth was saturated.

## ONE PERCENT FLOOD

## 3

**Why are we concerned about floods in Santa Clara Valley?**

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Santa Clara Valley is laced with large and small streams that are dry most of the year and potentially dangerous the rest of the time. But how did the streams form?

Through hundreds and thousands of years, rain has flowed from the hills that surround our Valley on three sides, eroding away soil to form stream channels. The streams were large enough to carry most flows but too small to handle the larger floods. Through the ages, these floods overtopped stream banks, ravaging open land and depositing silt over vast areas of the Valley floor.

This natural process will continue. Unfortunately, homes, business and industry today are located exactly in the areas which are subject to flooding. It is this problem that the district works to solve—to a limit.

This is no reasonable way to protect against potentially monstrous floods which might occur only once every few hundred years or more. But there is a level of flooding that can be planned for and guarded against—the one percent flood.

## 4

**What is the One Percent Flood?**

---

It is the flow of water that has a one percent chance of occurring in any given year.

Sometimes the one percent flood is called the hundred year flood, because it is the flood flow that would be equaled or exceeded about 100 times in 10,000 years—or an average of one time in a hundred years. But nature does not operate on a clock, so one cannot expect that the one percent flood would occur exactly once in a hundred years. It might not occur for two hundred years, for example, or it might occur twice in one year.



## ONE PERCENT FLOOD

## 5

**Why design flood protection projects to the one percent flood standard?**

Floods damage farms, homes and businesses. They can and do cause loss of life. To reduce these losses some protection should be provided to agricultural and urban communities. But what amount of protection? Can protection be provided against any flood?

It is just not economically reasonable to attempt to provide protection against the largest flood that could occur. Such protection would be too costly for such a rare event.

Therefore, governmental and private institutions have agreed that a one percent risk - on the average one chance out of a hundred in any one year - is a reasonable level to protect against.

Planning for the one percent flow has proven to be a good compromise between not doing enough and spending too much. Many other agencies, besides the district, use the predicted one percent flow to design their flood protection systems. The United States Army Corps of Engineers, Soil Conservation Service, Department of Transportation and others use one percent flow estimates to design channels and bridges and to protect facilities in which they have an interest.

For example, the one percent flood has a better than 30 percent chance of occurring during the life of an ordinary home loan, and it is this fact along with other reasons that the Federal Insurance Administration now requires newly financed homes in flood prone areas to be insured against the one percent flood.

## 6

**How are flood flows estimated?**

Floods, like many things in nature, are random events. The science of dealing with random events is known as statistics.

We all use probability, consciously or otherwise, when playing cards or other games of chance. One could say that nature deals out a new hand one day at a time. Unlike card games, however, nature does not reveal the rules, nor is there any choice about whether to play. Estimating peak flows is a good example of the way engineers use statistics to discover the rules that apply to nature's flood game.

Data has not been gathered long enough in Santa Clara Valley to know what the peak stream flows have been over the past several hundred years. Therefore, we cannot depend on past flow records alone to tell us what future flows will be. Instead, we must use what records we do have and estimate the future flows by using statistical methods. The statistical methods involve use of mathematical concepts and formulas. The essential steps to understanding these concepts are described in the following paragraphs.

## ONE PERCENT FLOOD

## 7

Stream Flow Data Method

The basic data comes from measured and recorded stream flows. When the largest (peak) flows from each year are organized in a data table, or plotted on a bar graph, they show that most of the peak flows are within a limited range for the stream under study. These flows happen more often, or with greater frequency. There are usually a few peak flows of much greater magnitude than the rest. Although these larger flows happen far less often, their potentially destructive force presents too great a risk to ignore.

When all the usable records are plotted on special graph paper (log probability paper), they suggest a trend line. The notations on the graph tell how large the flows have been and how often they occurred. By extending the trend line beyond the plotted record one can obtain an estimate of the size of the one percent flow even though such a flow magnitude may not have been included in the record. Once the less likely, but far more threatening one percent flow is determined, estimates can be made of possible damages from the flood. Then, protective measures can be proposed.

The process just described is a simplified description of sophisticated computer and statistical techniques the district uses to go through the estimating procedure.

## 8

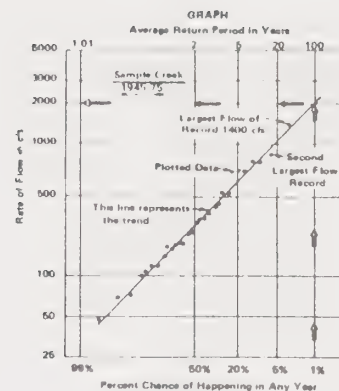
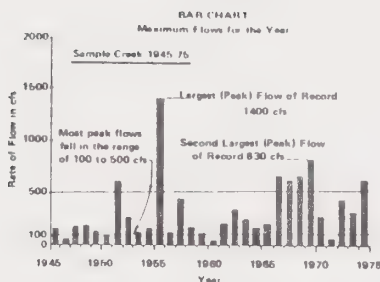
Regional Equation Method

Because not all streams have stream gages on them and because good historical data is not available on every stream, another estimating technique has been developed. This method uses available streamflow data on similar streams, rainfall data, and measurable watershed characteristics to estimate the one percent flood flow.

It has been found that rainfall quantity and the shape and size of watersheds are essential parts of equations used to predict flood flows. These measures are used in the formulas called Regional Equations to predict the flow in any watershed for any frequency, including the one percent value. Thus, by knowing the characteristics of the watershed and its rainfall potential, it is possible to estimate the one percent flow for all watercourses in the district.

Estimates by Regional Equations are checked and proven by the use of streamflow data on streams with long records. Regional Equations are essential means for flood flow predictions where streamflow records are nonexistent or of inadequate length.

## ONE PERCENT FLOOD



The graph shows that the Channel should be Designed for 2000 cfs, the 1% Design Flow

## Glossary of Terms

**Capacity** - The ability to carry or move the amount of water that can flow through a channel, stream, or pipeline.  
**Cfs** - Cubic feet per second. Used to describe the amount of flow or discharge from a water source. One cubic foot of water per second is equivalent to 450 gallons of water per minute.

**Correlation** - A relationship between two sets of data making it possible to predict one if the other is known.

**Discharge** - The rate at which water is flowing, generally expressed in cubic feet per second.

**Drainage basin** - The geographical area within which all surface water tends to flow into a single river, watercourse or stream. Also called a watershed.

**Estimate** - Calculate approximately, but with a known confidence.

**Flood** - An overflowing of water on an area normally dry.

**Inundation** - Overflow; to cover with water.

**Floodplain** - Relatively flat area adjoining streams that could be flooded.

**Flow** - The amount of water moving along a watercourse or channel. See Cfs, discharge.

**Frequency** - The number of occurrences in a given period.

**Hydrology** - The science of water, its properties, laws and distribution. "It is as much an art as a science and numerical results must be thoroughly backed with experience." (Engineers use as much information and the best techniques available to make sound estimates of design flows.)

**One Hundred Year-Flow** - 1% flow. On the average over a long period of time, a flow this size or larger has a once-in-100 years chance of happening.

**One Percent Flow** - 100 year flow. A flow that has a one percent chance of occurring in any given year.

**Peak Flow** - The maximum instantaneous rate of flow of water.

**Random** - Happening by chance.

**Runoff** - The flow of water that runs off a surface, usually rainwater that is not absorbed.

**Saturated** - Having absorbed all that can be taken up; wet; soaked through with moisture.

**Watershed** - Area over which water drains.



APPENDIX B





## ORDINANCE NO. 74-2

AN ORDINANCE OF SANTA CLARA VALLEY WATER DISTRICT  
DEFINING LIMITS OF FLOOD CONTROL RESPONSIBILITY; PROVIDING  
FOR MAINTENANCE OF WATERCOURSES;  
FOR JOINT USE OF PROJECTS, AND FOR DEDICATIONS;  
PROHIBITING POLLUTION OF DISTRICT WATER SUPPLIES AND  
INJURY TO DISTRICT PROJECTS, AS DEFINED, AND ENCROACHMENT  
UPON OR INTERFERENCE WITH WATERCOURSES EXCEPT BY PERMIT;  
PROVIDING PENALTIES FOR VIOLATION HEREOF;  
AND REPEALING ORDINANCE 74-1

The Board of Directors of Santa Clara Valley Water District do ordain as follows:

**SECTION 1 INTENT**

It is the intent of this Ordinance to secure the health, safety and welfare of the people of the District by prudent floodplain management, by protecting the quality of District water supplies, and by securing maintenance of watercourses and prohibiting injury to District property and projects and harmful amendment of watercourses.

It is further the intent of this Ordinance to provide a definition of the general limits of watercourses on which the District may request rights of way for flood control purposes and construction of flood control facilities.

It is further the intent of this Ordinance to insure that the repeal of Ordinance 74-1, accomplished heretofore, shall not affect permits heretofore given and rights of every nature heretofore established pursuant to said Ordinance 74-1.

**SECTION 2 DEFINITIONS**

2.1 "Bank or Banks of a Watercourse" means the sides of a watercourse the top of which shall be the topographic line roughly parallel to stream center line where the side slopes intersect the plane of ground traversed by the watercourse. Where banks do not distinguishably end, the surrounding country being extensions of the banks, the top of such banks shall be as determined by the District.

2.2 "Board" means the Board of Directors of the Santa Clara Valley Water District.

2.3 "Design Flood" means the selected flood against which protection is provided, or eventually will be provided, by means of flood protective or control works.

2.4 "Designated Floodway" means the channel of a stream and that portion of the adjoining floodplain required to reasonably provide for passage of the design flood.

2.5 "District" means Santa Clara Valley Water District.

2.6 "District Project" means any facility, structure or improvement of the District including, without limitation, lands, facilities, structures or improvements and appurtenances thereto owned or controlled by the District for water conservation, water utility, flood control or any lawful District purpose.

2.7 "Levee" means an elongated embankment constructed where required to contain flooding.

2.8 "Pollution" means impairment of water quality to a degree which adversely and unreasonably affects a beneficial use of the water.

2.9 "Structure" means anything made or constructed and having its foundation or support upon or within the ground.

2.10 "Watercourse" means an elongated channel or depression, whether natural or man-made, in which water does or may flow and may include the overflow area, if any, of such channel or depression. For the purposes of this Ordinance, "watercourse" includes such channels or depressions, although the same may be by reason of size of area drained not deemed to be a flood control facility.

**SECTION 3 MAINTENANCE BY OWNER**

Every owner of a watercourse whether a person, firm corporation, or governmental agency, or such owner's lessee or tenant, shall keep and maintain the same in a condition which will not contribute to pollution as prohibited by Section 6.1 hereof and which will not unreasonably change or retard the flow of the water, and every owner of a structure within or directly affecting a watercourse shall maintain the safe condition and function of the same.

**SECTION 4 DISCHARGE OF DRAINAGE**

The County of Santa Clara, any

municipality and any agency or person within the District shall have the right to discharge drainage water of non-polluting quality directly into watercourses, except water supply canals and percolation facilities, of the District subject only to the approval procedure set forth in this Ordinance.

**SECTION 5 FLOOD CONTROL RESPONSIBILITY**

5.1 The responsibility of this District for the control of flood and storm water is an obligation to make efficient use of its funds in designing, constructing and maintaining such works as the Board shall approve. The responsibility of the District does not and cannot extend to an affirmative obligation to take specific measures of any nature not mandated by governing legislation or judicial order. This Ordinance may not be deemed an imposition of a duty upon the District other than as specific above and no assertion of public liability shall be based thereon. Nothing in this Ordinance shall be deemed to be or construed as a warranty or assurance that flooding and flood damage will not or cannot occur anywhere in the District. However, the District will provide flood control service in an emergency to the extent of its resources and ability. The District accepts an obligation to design, construct and maintain its works in such manner as to avoid or minimize harmful disturbance of the natural environment.

5.2 Construction and maintenance, or acceptance and maintenance, of flood control works and control of flood and storm waters by the District shall be subject to the following:

A. The District will so act in a reach or portion of a watercourse only if it has sufficient legal title or right of way therein.

B. Artificial channels of any kind, regardless of the size of tributary watershed, are excluded from District responsibility unless the same are constructed by the District or are approved and adopted by the Board.

C. A reach or portion of a natural watercourse will not be deemed within District flood control jurisdiction unless the tributary watershed area upstream of such reach or portion is in excess of 320 acres (one-half square mile); provided, that such area may be either greater or less than 320 acres pursuant to agreement with the city or county having jurisdiction.

5.3 A watercourse or reach or portion thereof over which the District is not deemed to have flood control jurisdiction by reason of the exclusions specified in Subparagraphs B and C of Section 5.2 above is deemed a local drainage facility.

5.4 Flood control facilities serving a watershed area of 320 acres (one-half square mile or more) shall have a design capacity to safely convey the one percent flood ("100-year flood") plus freeboard. The standard, however, may be lowered to be consistent with land use designations of city or county land use master plans. Freeboard design criteria shall be established by the District based upon accepted engineering practices.

5.5 Storm water drainage facilities serving a watershed area less than 320 acres (one-half square mile) and qualifying under agreement per paragraph 5.2c shall have a design capacity to convey the ten percent flood ("10 year flood") plus freeboard. Freeboard design criteria shall be established by the District based upon accepted engineering practices. The storm water drainage facilities referred to in this section are the major collectors and are not deemed to include storm sewers used to drain urban developed sites. The design of storm sewers rests with the local agency having jurisdiction of the urban development served. In drainage areas less than 320 acres, where urban development exists or may occur, the drainage facilities should be designed to provide for the conveyance or detention of the flood

flows in excess of the ten percent flood up to the one percent flood in the streets or open space areas so that development is not subject to flooding by such excess flood flows. Otherwise, the structures must be flood-proofed, as prescribed by Federal Emergency Management Agency regulations, or the storm water drainage facility must be designed as provided in Section 5.4 above.

## SECTION 6 PROHIBITIONS

6.1 The pollution of the water supplies of the District, whether in surface streams, reservoirs or conduits of any kind, or of ground-water, by any direct or indirect means whatever, including the deposit of polluting matter of any kind upon the banks of a watercourse, lake or reservoir where the same may reach or affect such water supplies, and including the discharge of polluting storm waters or sanitary sewage, is prohibited.

6.2 Without having first secured a permit pursuant to Section 7 hereof, or other written approval from the District, it shall be unlawful after the effective date of this Ordinance for any person, firm, corporation, the County of Santa Clara, the Government of the United States and agencies thereof, the Government of the State of California and agencies thereof, or any municipal corporation or district to do or cause to be done any of the following:

A. Construct or place any structure or perform any grading within a designated floodway between the banks of a watercourse, or within 50 feet of the top of such banks.

B. Construct, place or maintain any structure or perform any grading upon a levee or on a District project.

C. Excavate within a designated floodway, upon a levee, or upon or between the banks of a watercourse, or District project.

D. Deposit material of any kind within a designated floodway, upon a levee, or District project, or upon or within the banks of a watercourse.

E. Construct or place any outlet for discharging drainage waters within a designated floodway, upon or within the banks of a watercourse or District project.

F. Plant any form of flora upon or within the banks of a watercourse or a District project.

G. Trespass in any manner whatsoever including the driving of vehicles on any property in which the District owns a fee simple interest or on which the District owns an exclusive easement for flood control, drainage or water conservation or distribution purposes, except such areas as have been opened to and developed for public recreational or other use.

6.3 Permits shall not be withheld upon unreasonable or insubstantial grounds.

## SECTION 7 PERMIT PROCEDURE

7.1 Any person, firm, corporation or public agency, except those filing maps pursuant to the State Subdivision Map Act or local ordinances adopted pursuant thereto, desiring to do any of the acts for which a permit is required pursuant to this Ordinance shall make application for such permit to the District. Said applications shall contain such information as the District shall reasonably require.

7.2 Any public agency, or any person, firm or corporation filing a map pursuant to the State Subdivision Map Act or local ordinance adopted pursuant thereto, desiring to do any of the acts for which a permit is required pursuant to this ordinance shall, in lieu of the application procedure set forth above, submit engineered improvement plans to the District.

7.3 Upon receipt of such application for permit or engineered improvement plans or additional information as herein set forth, the District shall make such investigations as are necessary to determine, among other things, whether or not the proposed work or activities intended will impede, restrict, retard, pollute, change the direction of the flow of water, catch or collect debris carried by such water; is located where natural flow of the storm and flood waters will damage or carry any structure or any part thereof downstream; or will damage, weaken, erode, or reduce the effectiveness of the banks to withhold storm and flood waters, to resist erosion and siltation and entry of pollutants and contaminants, or interfere with maintenance responsibility or with structures placed or erected for flood control, water conservation or distribution. In order to make said investigation, the District may return said application or improvement plans to the applicant for additional information as may be required to complete

## APPENDIX C



Flood Damage Reduction Program

Each of the flood control zones has its own plan of action and activities for meeting the District's flood related objectives. This plan of action is referred to as a flood damage reduction program. Each flood damage reduction program is concerned with the various aspects of identifying flooding problems, preparing solutions to the flooding problems, and implementing those solutions.

The term "flood damage reduction" is used instead of "flood control" to acknowledge the fact that it is not feasible to completely eliminate potential flood damage from floods of all magnitudes.

Revenues

There are five primary potential sources of revenue available to the flood control zones to finance flood damage reduction activities. These sources are (1) the District's annual allocation of the County's 1% tax levy in each flood control zone, (2) the annual flood control benefit assessment levied on all parcels within each of the five flood control zones, (3) federal and state funds for federal flood control projects, (4) funding from city redevelopment projects, and (5) funding or capital improvements provided by private development. The District Board of Directors' current policy is that all revenues to a particular zone are to be spent within that zone, although the Board may legally combine zone ad valorem tax funds if desired.

Ad Valorem Taxes

A primary source of funding for flood damage reduction projects has been the ad valorem property tax within each flood control zone. This tax is levied on all privately owned land and improvements in each of the five zones. Until 1978, the tax rate could be varied in the zones. Since Proposition 13 in 1978, however, the District has received an allocation of the County's 1% tax levy in each flood control zone based on the average zone tax revenues in the three years prior to Proposition 13. The most recent one percent tax allocation received in each of the flood control zones is shown in Table X-1.



Benefit Assessment

The second primary source of income to fund flood damage reduction is the benefit assessment program. The District adopted this program in June 1981. The program was continued by the electorate in June of 1982 for 10 more years subject to an annual rate increase limit of 2%. Unlike taxes based upon property value, this program levies an assessment to each parcel of land within the five flood control zones based upon the benefit each parcel receives from flood damage reduction measures. The benefit assessment enabling legislation permits the benefit to each parcel to be determined based upon the proportional stormwater runoff for that parcel. To accomplish this, the following five categories of land use and their runoff factors have been adopted:

<u>Land Use Category</u>	<u>Runoff Factor</u>
A. Commercial and industrial	.8
B. Apartments, schools, churches high density residential	.6
C. Single family residential, small multiple (2-4 units)	.4
D. Utilized agricultural	.005
E. Non-utilized, undisturbed agricultural, salt ponds	.0015

The most recent revenues from the benefit assessment program are shown for each of the zones in Table X-2. A summary of flood damage reduction that has been achieved since the beginning of the benefit-assessment program is shown in Exhibit X-A.

Until the adoption of the benefit assessment program in June 1981, the Northwest and North Central Flood Control Zones had separate taxes to repay bonded indebtedness. This tax was in addition to their allocation of the County's 1% tax. With the implementation of the benefit assessment program, the Board of Directors discontinued the bond tax levy in these zones and the bond debt service is now paid from the zones' allocations of the 1% tax.



Federal and State Funds

Another potentially large source of financing is provided by the federal government and the State of California for federal flood control projects within Santa Clara County. When a federal project is authorized by Congress or by existing federal statutes, funds are appropriated to cover the study costs and the construction costs of the flood control facilities. The State of California contributes funds for a portion of the cost of rights of way and the relocation of bridges and utilities. The State portion varies according to a complicated formula but is generally about two-thirds of the non-federal costs. The remaining one-third of the non-federal costs and all maintenance costs are borne by the local sponsoring agencies (usually the Water District through its flood control zones). A list of the federal projects that are currently under construction or are being seriously considered are included in Table X-3.

Redevelopment Funds

When a flood problem exists within a designated redevelopment area and that problem is identified as one of the problems contributing to a blighted condition as defined under redevelopment law, tax funds raised within the redevelopment area can be used for flood control purposes. The funds must be used solely for work necessary to protect the redevelopment area but need not solely be used for flood control works located within the redevelopment area. For example, funds could be used for an upstream reservoir if such a facility would help solve the flood problem in the downstream redevelopment area.

Private Development

A fifth method of funding flood damage reduction projects is the use of private development capital. Although this method is feasible under many circumstances, it has historically been applied only in the case of small tributary streams. Under this procedure, the developer of a parcel of land will construct, at developer's cost, the facilities necessary to protect the development. The construction of these facilities is

usually one of the conditions of development recommended by the Water District and imposed by the city or County planning agency.

#### Expenditures/Budget Process

In order to ensure that available revenues for each of the zones are used efficiently in carrying out the flood damage reduction program for each zone, the District goes through an extensive annual budgeting process. The annual budget goes through many stages of review, including review by the various flood control advisory committees and a public hearing, before it is finally adopted by the Board of Directors. (The Flood Control Advisory committees are the subject of Section III.)

The budget is developed in a program budgeting format. Program budgeting, as used at this District, identifies all of the costs and impacts of each project proposal. It has four basic characteristics as it relates to the flood control zones:

1. It determines the various programs (categories of activities and projects) that must be carried out to meet the objectives of the District.
2. It considers all of the pertinent costs of activities and projects within a program, including capital expenditures.
3. It provides a plan for measuring costs and effectiveness of alternative ways of reaching the identified objectives.
4. It projects programs and program costs into the future on a planned and controlled basis so that the budgeting process is continuous from year to year.

The programs and their associated activities as used by the District in its budget process for each of the flood control zones are:

- Planning Program - This includes labor and contract services for both long range and detailed project planning up to but not including the design activity. Planning includes all planning studies, preparation of Engineer's Reports, Environmental Impact Reports, public hearings and certain special studies.

• Construction Program - This includes all labor, use or purchase of equipment and contractual services for design and the construction of a new project or a substantial improvement to the life or value of an existing physical project. Acquisition of new physical assets such as right of way are included in this program.

• Maintenance Program - This includes all work performed on District facilities which result in maintaining physical projects or equipment in working condition. It also includes emergency activities identifiable with a specific facility.

• Operations Program - This includes all work necessary for land ownership management and the application of District flood control ordinances.

• Administration Program - This includes the cost of insurance, debt service, flood emergency activities, and other general activities that cannot be identified with a specific project or facility.

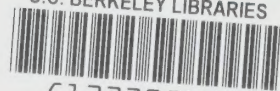
Program budgeting for this District requires each proposed scope of work to be identified with and budgeted to a specific program. This usually results in a progression of a project through the various programs. For instance, the need for a flood control structure must first be identified through a planning process, then it is designed and constructed, and finally maintained, operated and administered. The progression through these programs depends upon the size of the project, the priority it has been assigned, the availability of staff, the cost, and the available funds.

A budget summary for all of the flood control zones is presented in Table X-4 while Exhibit 3-2 presents a summary budget for one or more of the flood control zones. Section IV discusses the project development process that the District uses to implement needed flood damage reduction measures.





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